IN THE CLAIMS

1. A method for managing the distribution of datapackets, the method comprising the steps of:

associating a service-level policy that limits allowable bandwidths to particular nodes in a hierarchical network;

classifying datapackets moving through said hierarchical network according to a particular service-level policy;

delaying any said datapackets in a buffer to enforce said service-level policy;

maintaining a statistic for each said particular service-level policy related to how many said datapackets are in said buffer at any one instant;

sending any newly arriving datapackets to said buffer simply if a corresponding service-level policy statistic indicates any other earlier arriving datapackets related to the same service-level policy are currently being buffered; and

managing all datapackets moving through said hierarchical network from a queue in which each entry includes service-level policy bandwidth allowances for every hierarchical node in said network through which a corresponding datapacket must pass.

2. The method of claim 1, further comprising the step of:

testing in parallel whether a particular datapacket should be delayed in a buffer or sent along for every hierarchical node in said network through which it must pass.

3. The method of claim 1, further comprising the step of:

constructing a single queue of entries associated with corresponding datapackets passing through said hierarchical network such that each entry includes source and destination header information and any available bandwidth credits for every hierarchical node in said network through which a corresponding datapacket must pass.

4. A means for managing the distribution of datapackets, comprising:

means for associating a service-level policy that limits allowable bandwidths to particular nodes in a hierarchical network;

means for classifying datapackets moving through said hierarchical network according to a particular service-level policy;

means for delaying any said datapackets in a buffer to enforce said service-level policy;

means for maintaining a statistic for each said particular service-level policy related to how many said datapackets are in said buffer at any one instant;

means for sending any newly arriving datapackets to said buffer simply if a corresponding service-level policy statistic indicates any other earlier arriving datapackets related to the same service-level policy are currently being buffered; and

means for managing all datapackets moving through said hierarchical network from a queue in which each entry includes service-level policy bandwidth allowances for every hierarchical node in said network through which a corresponding datapacket must pass.

5. The means of claim 4, further comprising:

means for testing in parallel whether a particular datapacket should be delayed in a buffer or sent along for every hierarchical node in said network through which it must pass.

6. The means of claim 4, further comprising:

means for constructing a single queue of entries associated with corresponding datapackets passing through said hierarchical network such that each entry includes source and destination header information and any available bandwidth credits for every hierarchical node in said network through which a corresponding datapacket must pass.

7. A network management system, comprising:

a protocol processor providing for header inspection of datapackets circulating through a network and providing for an information output comprising at least one of source IP-address, destination IP-address, port number, and application type;

a classifier connected to receive said information output and able to associate a particular datapacket with a particular network node and a corresponding service-level policy bandwidth allowance;

a single queue comprising individual entries related to said datapackets circulating through said network, and further related to all network nodes through which each must pass; and

a traffic-shaping cell providing for an inspection of each one of said individual entries and for outputting a single decision whether to pass through or buffer each of

said datapackets in all network nodes through which each must pass;

wherein, means datapackets in a buffer are delayed to enforce said service-level policy, and a statistic is maintained for each said particular service-level policy related to how many said datapackets are in said buffer at any one instant, and any newly arriving datapackets are sent to said buffer simply if a corresponding service-level policy statistic indicates any other earlier arriving datapackets related to the same service-level policy are currently being buffered, and all datapackets moving through said hierarchical network from a queue are controlled in which each entry includes service-level policy bandwidth allowances for every hierarchical node in said network through which a corresponding datapacket must pass.

8. The system of claim 7, further comprising:

an output scheduler and marker for identifying particular ones of the individual entries in the single queue that are to be passed through or buffered.

9. The system of claim 7, wherein:

at least one of the protocol processor, classifier, and traffic-shaping cell, are implemented as a semiconductor intellectual property and operate at run-time with the single queue.